Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	}	
	}	
Revision of Part 15 of the Commission's	}	
Rules Regarding Ultra-Wideband	}	ET Docket No. 98-153
Transmission Systems	}	

Reply Comments of Multispectral Solutions, Inc.

Multispectral Solutions, Inc. (MSSI) is pleased to submit these further reply comments in response to the Notice of Proposed Rule Making (NPRM), FCC 00-163, in the above referenced proceeding.

The purpose of these comments is to provide the Commission with a suggested set of revisions to 47 CFR Section 15 to permit the unlicensed use of ultra-wideband (UWB) devices. The suggested wording reflects MSSI's current understanding of the interference effects of UWB emissions operating in bands below 3.1 GHz as reflected in extensive test and measurement data from the National Telecommunications and Information Administration (NTIA)[1,2], Stanford University/DOT[3] and the Johns Hopkins University/Applied Physics Laboratory[4].

Contained below is an hypothetical 47 CFR "Section 15.5" and "Subpart F" for Unlicensed Ultra-Wideband Devices (U-UWB). Much of the proposed regulations mirror those currently in place for unlicensed National Information Infrastructure (U-NII) devices under 47 CFR Subpart E. For example, the issue of point-to-point U-UWB operations is treated as in 47 CFR Section 15.407(a)(3).

MSSI respectfully suggests to the Commission that a set of proposed rule making changes, such as those submitted in this document, be provided for comment under a Further Notice of Proposed Rule Making (FNPRM) prior to the release of a final Rule and Order. We believe that,

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[1] "The Temporal and Spectral Characteristics of Ultrawideband Signals," William A. Kissick, editor, NTIA Report 01-383, January 2001 (http://www.its.bldrdoc.gov/pub/ntia-rpt/01-383/). "Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems," Brunson, L.K. et al., NTIA Special Publication 01-43, January 2001 (http://www.ntia.doc.gov/osmhome/reports/uwb/uwb.pdf).

[2] David S. Anderson, Edward F. Drocella, Steven K. Jones and Mark A. Settle, "Assessment of Compatibility between Ultrawideband (UWB) Systems and Global Positioning Systems (GPS) Receivers", NTIA SPECIAL PUBLICATION 01-45, February 2001. J. Randy Hoffman, Michael G. Cotton, Robert J. Achatz, Richard N. Statz and Roger A. Dalke, "Measurements to Determine Potential Interference to GPS Receivers from Ultrawideband Transmission Systems", NTIA REPORT 01-384, February 2001.

[3] "Potential Interference to GPS from UWB Transmitters, Test Results. Phase 1A: Accuracy and Loss-of-Lock testing for Aviation Receivers," M. Luo, D. Akos, S. Pullen and P.Enge, Stanford University, 26 October 2000.

[4] "Final Report, UWB-GPS Compatibility Analysis Project," The Johns Hopkins University/Applied Physics Laboratory, 8 March 2001.

given the clarification provided by the above test and measurement programs, the current NPRM is too vague in its wording to support a direct path from NPRM to Rule and Order as presently envisioned.

Respectfully submitted,

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Subpart F - Ultra-Wideband Devices
(Proposed)

Section 15.501 Scope.

This subpart sets out regulations for unlicensed Ultra-Wideband (U-UWB) devices operating in the frequency range above 3.1 GHz.

Section 15.503 Definitions.

(a) Short pulse modulation. A short pulse modulation is one which consists of narrow, short duration, pulses and in which the emission bandwidth is directly related to the narrow pulse width. Specifically excluded from this definition are direct sequence and frequency hopping spread spectrum, linear and nonlinear FM chirp, and other such modulations in which the signal envelope does not directly relate to the emission bandwidth.

(b) Emission bandwidth. For purposes of this subpart, the emission bandwidth shall be the difference (f_H-f_L), where f_H is the upper frequency of the -10 dB emission point and f_L is the lower frequency of the -10 dB emission point.

(c) Fractional bandwidth. The fractional bandwidth of an emission is $2(f_H-f_L)/(f_H+f_L)$ where f_H and f_L are as defined in (b) above. The formula can also be written as $(f_H-f_L)/f_C$ where f_C is the center frequency. The center frequency is calculated as $(f_H+f_L)/2$.

(d) Pulse repetition frequency. The pulse repetition frequency, or PRF, of an emission is defined as the peak pulse rate as measured in any 0.1 second interval; i.e., (# pulses emitted in 0.1 second interval)/(0.1 seconds).

(e) U-UWB devices. Intentional radiators operating in the frequency bands above 3.1 GHz that use short pulse modulation and have either a fractional bandwidth greater than 0.25 or an emission bandwidth of 1.5 GHz or greater.

Section 15.505 Cross reference.

(a) The provisions of Subparts A, B, and C of this part apply to unlicensed U-UWB devices, except where specific provisions are contained in subpart F. Manufacturers should note that this includes the provisions of Section 15.203, but does not include the provisions of Section 15.205 in the frequency range above 3.1 GHz.

(b) The requirements of subpart F apply only to the radio transmitter contained in the U-UWB device. Other aspects of the operation of a U-UWB device may be subject to requirements contained elsewhere in this chapter. In particular, a U-UWB device that includes digital circuitry not directly associated with the radio transmitter also is subject to the requirements for unintentional radiators in subpart B.

Section 15.507 General technical requirements.

(a) Power Limits:

(1) In the frequency range above 3.1 GHz, the peak transmit power shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-UWB devices operating above 3.1 GHz may employ a directional antenna gain greater than 23 dBi without any corresponding reduction in the transmitter peak output power. For fixed, point-to-point U-UWB transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-UWB device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(2) The peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrumentation limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement conforming to the above definitions for the emission in question.

(b) Undesirable Emission Limits:

(1) All emissions below 3.1 GHz shall not exceed an EIRP of -91.25 dBm/MHz, or 50 dB below -41.25 dBm/MHz, the general emission limit specified in Section 15.209.

(2) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz.

(3) The pulse repetition frequency of any U-UWB emission shall not exceed 20 Mpps (20 million pulses per second).

(4) Any U-UWB devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

(5) The provisions of Section 15.205 of this part do not apply to intentional radiators operating under this section.

(6) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

(7) U-UWB devices are subject to the radio frequency radiation exposure requirements specified in § 1.1307(b), § 2.1091 and § 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(8) Manufacturers of U-UWB devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.